

Welfare problems in alpine dairy cattle farms in Alto Adige (Eastern Italian Alps)

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ABSTRACT – The present investigation aims to highlight the main welfare problems of dairy cattle farms in Alto Adige (North Eastern Italy) by means of animal based indicators. The relationship between animal based and resource based (housing and management) indicators were investigated in order to obtain useful information for improving welfare levels in mountain husbandry systems. We highlighted some welfare problems, especially in tie-stalls, mainly related to stall and feed trough dimensions and design; however, in these situations good stockmanship seems to be able to compensate for structural lacks.

Key words: Dairy cattle, Mountain animal husbandry, Welfare and Behaviour, Lesions.

Introduction – Forty-six per cent of Italian dairy cattle farms are located in mountain areas; these farms contribute to 17.5% of the total national milk production (Pieri, 2005). Their characteristics differ from those of farms in plain areas, as they have a smaller size and lower productions per cow (ISMEA, 2004). Because of environmental constraints, the housing structures of these farms are frequently characterized by the presence of tie-stalls, which represent a critical husbandry situation from a welfare point of view, due to the extreme restriction of movement and of the limitation to exhibit the normal behavioural repertoire (Mattiello *et al.*, 2008). Animal welfare is presently a widely debated issue at national and international level. No specific Directive has been emanated about dairy cattle farming systems yet; however, in 2007 the European Food Security Authority (EFSA) asked for a scientific report on the “Welfare of dairy cows”. The Opinion on this topic is due in March 2009. The respect of animal welfare standards became urgent also in order to satisfy the PAC requirements, that state a conditionality for the access to public support on the basis of the respect of minimal standards as to environmental protection and animal welfare. Few specific studies on welfare problems of dairy cattle in mountain husbandry systems have been carried out in Italy, and they concentrate mainly on the situation in Western and Central Italian Alps (Mattiello *et al.*, 2005; 2006). In the light of the above described frame, the present investigation aims to highlight the main welfare problems of dairy cattle farms in Alto Adige, where 64.3% of the total surface area is located at altitudes between 1000 and 2000 m a.s.l. (ASTAT, 2002). Animal based indicators (Main *et al.*, 2003) have been analysed in order to understand their relationship with resource based indicators (housing and management) and to obtain useful information for improving welfare levels in mountain husbandry systems.

Material and methods – A survey was carried out in 14 farms (2 in free stalls with cubicles and 12 in tie-stalls, 3 of which used to take cows to mountain ranges during the summer) located in the Autonomous Province of Bolzano (Alto Adige, North-Eastern Italy). Data were collected during on-farm visits by a questionnaire to the farmer and by direct measurements that provided information about the housing structures and about some management practices. Specific data were recorded on 185 individual cows (147 in tie-stalls and 38 in free stalls) about BCS (0=too thin, 1=normal, 2=too fat), integument alterations (presence of hairless patch areas with a diameter >5 cm, lesion/swelling areas

with a diameter >5 cm and overgrown claws), lameness, other health parameters (presence of ocular, vaginal or nasal discharge, cough, diarrhea), shoulder conformation (presence of "open shoulders"; Mattiello *et al.*, 2006), lying down and getting up movement (Albright and Arawe, 1997) and Avoidance Distance at the Feeding rack (ADF). ADF was recorded as the distance from the observer's hand and the muzzle of the cow, when the cow showed the first avoidance reaction from the approaching observer. Most of these variables were collected following the prototype monitoring system of the EU Welfare Quality® project, occasionally modified in order to fit the specific operative conditions. Data were submitted to non parametric analysis of variance (Kruskall Wallis test) for mean comparison, while frequency distributions were compared by Fisher exact test.

Results and conclusions - In lactating cows (n=168) BCS was too lean in 13.7% of the animals, and it was normal in all other the animals. In dry cows (n=17) only one individual (5.9%) was in poor body conditions, while all the other animals were in normal conditions. From these data emerges a good general condition of cows in the visited farms. Only 15.7% of the cows showed the presence of hairless patch areas (never more than two per animal), mainly in the carpus and knee regions. No statistical differences were found between tie-stalls and free stalls as to the presence of hairless patch areas (17.7% *vs.* 7.9% of individuals, respectively), while the use of alpine pasture during the summer significantly affected this variable (30.6% of individuals with pasture *vs.* 12.1% of individuals without pasture; $P < 0.01$). It is possible that some of the hairless patch areas are due to parasite infections during the summer grazing period, when these problems are more frequent than during the indoor winter period. The presence of skin lesions or swelling areas was recorded in 10.8% of the cows. Significant differences were found between cows in tie-stalls and in free stalls (12.9% *vs.* 2.6% of individuals, respectively; $P < 0.05$); in fact, lesions were concentrated on the legs, mainly at the level of haunches and heels (possibly due to the lack of comfort when lying down), or on the neck (probably due to the presence of a frontal bar above the feed trough). No differences were found in the prevalence of lesions depending on the use of alpine pasture in the summer. As to claw conformation, the percentage of overgrown claws did not significantly differ between cows in tie-stalls or in free stalls, although it was lower in free stalls (22.4% *vs.* 13.2% of cows), and it was not significantly affected by the use of alpine pasture. For cows in tie-stalls, significant differences were recorded depending on the presence/absence of mats in the lying down area: where mats were present, the percentage of overgrown claws was 29.4% *vs.* 6.7% in the absence of mats ($P < 0.001$). This suggests that a soft support, in spite of guaranteeing a comfortable lying area, does not allow a sufficient consumption of the claws. In these situations it should be advisable either to trim claws more frequently or to let the cows move periodically, in order to consume claws. No difference in the prevalence of lame cows was found depending on the type of stall (tie-stall *vs.* free stall) or on the use of alpine pasture in summer. As to health parameters, only 3 cows (1.6%) showed the presence of ocular, vaginal or nasal discharge, 2 (1.1%) showed signs of cough and 3 (1.6%) presented diarrhea, regardless of the housing or management situation. The presence of "open shoulders" was significantly higher in tie-stalls than in free stalls (38.1% *vs.* 2.6% of cows; $P < 0.001$). In tie-stalls, when cows were tied by a tether fixed to the feed trough (which severely limited the animal's movements, as the tether junction was fixed), the prevalence of cows with open shoulders was 42.9%, while where there was a vertical chain tying system (where the tether junction could move up and down along a vertical bar, thus allowing more movement to the cow), only 17.2% of the cows showed this abnormal shoulder conformation ($P < 0.001$). The presence of open shoulders was higher where feed trough bottom height was lower than 15cm from stall platform (46.8% of cows); when this height exceeded 15cm, open shoulders were present only in 7.9% of the cows ($P < 0.001$). This results support the hypothesis that an incorrect shoulder conformation derives from an unnatural posture of tethered cows, especially when movements are particularly restricted and when the animals are forced to lean out beyond the feed trough wall in order to reach the bottom of the feed trough. Lying down and getting up movements were also significantly affected by stall type: in tie-stalls these

behaviors were performed in an abnormal way (Albright and Arawe, 1997) in 33 (20.7%) cases out of 159 observed movements, whereas in free stalls only one cow was observed to perform an abnormal movement during the lying down transition ($P<0.001$). The height of the feed trough walls in front of the animal did not affect these movements, in contrast with what is reported by the existing literature (Albright and Arawe, 1997; Mattiello *et al.*, 2005). However, it seems that it takes a longer time for cows to get up in the presence of feed trough walls >30 cm (8.08 ± 0.87 vs. 5.51 ± 0.33 s; $P<0.01$) and when the tethering system is more restrictive (6.70 ± 0.34 vs. 5.29 ± 0.38 s in cows tied by a tether fixed to the feed trough and where there is a vertical chain tying system, respectively; $P<0.01$). Lying down position was incorrect (cow lying partly or completely outside the stall/cubicle, or showing evident signs of compression or discomfort of the hind part of the body) in 24 (34.8%) out of 69 cows observed in tie-stalls and only in one (5.6%) out of 18 cows observed in free stalls ($P<0.01$). In tie-stalls, this abnormal behavior was significantly affected by stall width (<105 cm: 83.3%, ≥ 105 cm: 30.2%; $P<0.05$) and by the presence of partitions between stalls (with partitions: 23.4%, without partitions: 59.1%; $P<0.01$). These results support the recommendations by Bovagne and Frayer (1998) as to minimum stall width dimensions and the previous results by Mattiello *et al.* (2005) on the importance of the presence of partitions. Abnormal lying down positions were recorded more often in stalls with length ≤ 175 cm (46.2% of the cows), while with longer stalls the percentage of wrong lying down positions was lower (27.9% of cows); this difference was not significant and the high percentage of cows presenting this incorrect position suggests that several other factors, besides stall length, play an important role for guaranteeing a sufficient comfort. Mean ADF was 22.77 ± 3.05 cm and it was significantly lower in tie-stalls ($n=63$, $ADF=16.33\pm3.00$ cm) than in free stalls ($n=35$, $ADF=34.34\pm6.23$ cm) ($P<0.01$), revealing the presence of a better human-animal bond in tie-stalls. This may be due to the strict relationship between the farmer and the cows in a situation where most of the work should be done by hand, as the level of mechanization is very low, and herd size is small (only 11.75 ± 1.43 lactating cows/farm in tie-stalls vs. 29.50 ± 15.50 in free stalls; $P<0.01$). In conclusion, we highlighted some welfare problems, especially in tie-stalls, mainly related to structural causes (stall and feed trough dimensions and design); however, in these situations the presence of good stockmen is probably of help in order to compensate, to a certain extent, to structural lacks. In fact, the sanitary status and the general conditions of the cows were good. Financial support to farmers is advisable in order to achieve structural changes for improving welfare levels in these husbandry systems.

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REFERENCES - Albright, J., Arawe, C., 1997. The Behaviour of cattle. Cab International, Oxon. ASTAT, 2002. 5° Censimento generale dell'agricoltura 2000. Provincia Autonoma di Bolzano-Alto Adige, Istituto Provinciale di Statistica, Bolzano. Bovagne, J., Frayer, C., 1998. Guide pour la conception et l'aménagement des bâtiments d'élevage bovin dans les régions de montagne. Project Interreg. n. 105, Chambre d'Agriculture de la Haute Savoie. Assessorat de l'Agriculture et des Ressources Naturelles. Région Autonome Vallée d'Aoste. Aosta. - Main, D.C.J., Kent, J.P., Wemelsfelder, F., Ofner, E., Tuytens, F.A.M., 2003. Applications for methods of on-farm welfare assessment. *Anim. Welfare* 12:523-528. Mattiello, S., Punti critici e approccio alla valutazione del benessere nei sistemi zootecnici alpini. Quad. SoZooAlp 5, in press. Mattiello, S., Arduino, D., Tosi, M.V., Carenzi, C., 2005. Survey on housing, management and welfare of dairy cattle in tie-stalls in western Italian Alps. *Acta Agric. Scand. - Sect. A* 55:31-39. Mattiello, S., Bettini, A., Timini, M., Marzi, F., Marchesini, S., Comi, C., Patamia, N., 2006. Indagine sul benessere delle bovine da latte in posta fissa in Valtellina. Quad. SoZooAlp 3:75-83. ISMEA-Osservatorio latte, 2004. Il mercato del latte – Rapporto 2004. <http://www.unicatt.it/istituti/ecagro/ossalatte/scheda.asp>. Pieri, R., 2005. La produzione di latte vaccino. Osservatorio Latte, 15 novembre 2005.